UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,637	07/10/2003	Antonio Nucci	2315/SPRI.104359	3421

32423 7590 05/02/2007

SPRINT COMMUNICATIONS COMPANY L.P.
6391 SPRINT PARKWAY
KSOPHT0101-Z2100
OVERLAND PARK, KS 66251-2100

EXAMINER	
SONI, KETAN S	

ART UNIT	PAPER NUMBER
2609	

MAIL DATE	DELIVERY MODE
05/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/616,637	NUCCI ET AL.	
	Examiner	Art Unit	
	Ketan Soni	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07/10/2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/10/03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/17/03, 11/5/03, 2/19/04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement submitted on Feb 19, 2004 has been considered by the Examiner and made of record in the application file. Information disclosure statement submitted on Oct/12/2003 has been withdrawn as per applicant's request on Nov/05/2003, and therefore not considered.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 1, 10, and 11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim: 1 is non statutory since claim 10 is evidence that the method is just instructions on a media and therefore there is no practical application.

Consider Claim 10, the "computer readable media," in accordance with the specification of application, may be an electromagnetic signal (see paragraphs [0038] and [0039]). This subject matter is not limited to that which falls within a statutory category of invention because it is not limited to a process, machine, manufacture, or a composition of matter. Instead, it may include a form of energy. Energy does not fall within a statutory category since it is clearly not a series of steps or acts to constitute a process, not a mechanical device or combination of mechanical devices to constitute a machine, not a tangible physical article or object which is some form of matter to be a product and constitute a manufacture, and not a composition of two or more substances to constitute a composition of matter.

Claim 10 is also non-statutory since instructions can be on a communications media as disclosed.

Claim 11 appears to be apparatus, it includes judicial exception - instructions as evidenced by claim 10 -, and therefore it needs a practical application in claim. Since it only indirectly refers to the instructions there is no practical application.

Double Patenting

Claim 6 of this application conflict with claim 7 of Application No. 10/615649. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in

scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claim 6, and its interleaving limitations (claims: 1, 2, 4, 5, 6) are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 7 and its intervening limitations (claims: 1, 2, 3, 4, 5, and 6) of copending Application No # 10/615649. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, and 10 are rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication # 2002/0097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966).**

Consider **claims 1 and 10**, Doverspike et al. clearly show and disclose computer' readable media having instructions for and a method for identifying optimal mapping of logical links to the physical topology of the network (an optical network, organized into a general topology of links and nodes 110, . . . , 190, column: 2, paragraph [0012]), comprising: obtaining one or more mapping options for mapping multiple logical links between one or more pairs of network nodes (A general heuristic is to create some cost

metric and select a "minimum weight" path among all suitable paths that minimizes the cost metric and has the required size for the connection request, Column: 5, paragraph [0019]) onto physical paths that are at least relatively disjoint; obtaining a priority order of the network node pairs; (The restoration path is selected from a graph of links in the network which are physically diverse from the service path. For example, in the context of optical networking, the links do not share a common fiber span with the service path, Col. 1, paragraph [0006]; Selecting a service path in response to the communication request, accordingly, may be accomplished by computing a path between the source and destination that minimizes some cost metric and which has the required size for the connection request. It is assumed that each OXC node has knowledge of the whole optical network topology and the number of free channels on each link as well as some optical link weight function. A known shortest path algorithm such as Dijkstra's shortest path algorithm may be used to compute the minimal weight path through the network, Col. 6, paragraph [0021] and "The process of computation of service path and restoration path for a connection request relies on the information about the availability of optical network resources and the path selection objective. A general heuristic is to create some cost metric and select a "minimum weight" path among all suitable paths that minimizes the cost metric and has the required size for the connection request, Col. 5, paragraph [0019]).

Doverspike et al. do not disclose how to use a priority order of the network node pairs for the purpose of correlating the mapping options with the priority order of the network nodes to identify optimal mapping of logical links to the physical topology of a network.

In the same field of endeavor, Nishiyama et al. clearly show and disclose obtaining a priority order of the network node pairs (Setting priority sequence: the object above can be achieved in the method by providing a sixth step in which when positional relationships between nodes at a reference level or nodes as a reference of placements are determined.... and a seventh step for determining positional relationships such that a pair having the higher priority is located at the nearer position, paragraph [0009]).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use priority order of the network nodes, as taught by Wolpert, in the method for identifying optimal mapping of logical links to the physical network topology as in Doverspike et al. for the purpose of selecting the optimal logical path (one of the method for shortest path algorithm) that meets a defined time constraint for minimal weight path through the network and average or minimum or maximum time delay for entity delivery, which is equivalent to a priority order.

Consider **claim: 2**, and as applied to claim 1, Doverspike et al. clearly show and disclose a method further comprising obtaining the availability of wavelengths in a network (Weights are computed for the links using an array representing a restoration link capacity - which is expressed as a number of channels/wavelengths in optical networking, Column: 1, paragraph [0006]).

Claims 4, 5 and 6 are rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication # 2002/0097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Wolpert (U.S. Patent # 6577601).**

Consider **claim: 4**, and as applied to the method of claim 2, Doverspike et al. in view of Nishiyama et al. do not disclose obtaining a maximum time delay allowed between each pair of network nodes.

However, Wolpert clearly shows and discloses obtaining a maximum time delay and using it to identify the optimal mapping (The objective of the invention is to optimize some measure of network performance, such as overall entity throughput ...average or minimum or maximum time delay for entity delivery, priority level for an entity, or some other measure of quality of service (QOS) on the network, Column. 3, lines: 52-59).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use maximum time delay as the cost metric, as disclosed by Wolpert, in the method for identifying optimal mapping of logical links to the physical network topology as disclosed by Doverspike et al. for the purpose of selecting the optimal logical path that meets a defined time constraint, and minimum or maximum time delay for entity delivery.

Consider **claim: 5**, and as applied to the method of claim 4, Doverspike et al. in view of Nishiyama et al. is generally silent about the method further comprising: obtaining the relative time delay allowed between two or more physical paths.

However, Wolpert clearly shows and discloses using maximum time delay and relative time delay as cost metrics to identify the optimal mapping (This cost, referenced to a particular i-to-j link, may be the maximum or minimum or average bandwidth available (if the entity is to be transported along that link, and if the entity is expressed in an electronic format), the time delay associated with use of that link, or some other suitable measure of cost of using the particular link, Column. 5, lines 51 –59; The preceding development identifies the i-to-j'(u) link for entity transport, using a maximum difference of two J(u)-component vectors, Target and Actual, that are determined iteratively, Column. 8, lines: 43 - 46).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use relative time delay and maximum time delay as taught by Wolpert incorporated with the method disclosed by Doverspike et al. for identifying optimal mapping of logical links to the physical network topology and use wavelength availability as cost metrics for the purpose of selecting the optimal logical path for entity transport.

Consider **claim: 6**, and as applied to the method of claim: 5, Doverspike et al. in view of Nishiyama et al. do not disclose the method which further comprising: correlating the mapping options with maximum time delay, the relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.

However in the same field of endeavor, Wolpert clearly shows and discloses using maximum time delay and relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network (This cost, referenced to a particular i-to-j link, may be the maximum or minimum or average bandwidth available, Column: 5, lines 51 –53; the time delay associated with use of that link, or some other suitable measure of cost of using the particular link, column: 5, lines: 51-59; and The preceding development identifies the i-to-j' (u) link for entity transport, using a maximum difference of two J(u)-

component vectors, Target and Actual, that are determined iteratively, Column: 8,lines 43 – 46) and the priority order (priority level of an entity) of the network node pairs to identify optimal mapping of logical links to the physical topology (for wavelength availability) of a network ((priority level or priority order) The objective of the invention is to optimize some measure of network performance, such as overall entity throughput, average or minimum or maximum time delay for entity delivery, priority level for an entity, or some other measure of quality of service (QOS) on the network, column. 3, lines 52-59).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to route entity throughput, average or minimum or maximum time delay for entity delivery, priority level for an entity, priority order of the network nodes, as taught by Wolpert, in the method for identifying optimal mapping of logical links to the physical network topology as in Doverspike et al. for the purpose of selecting the optimal logical path (one of the method for shortest path algorithm) that meets a defined time constraint for minimal weight path through the network and average or minimum or maximum time delay for entity delivery.

Claims 3 is rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication # 2002/0097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Wolpert (U.S. Patent # 6577601).**

Consider **claim: 3,** and as applied to the method of claim 2, Doverspike et al. in view of Nishiyama et al. clearly show and disclose a method for identifying the optimal mapping of logical links using a cost metric to assign a weight to the paths (Doverspike et al. discloses: The process of computation of service path and restoration path for a connection request relies on the information about the availability of optical network resources and the path selection objective. A general heuristic is to create some cost metric and select a "minimum weight" path among all suitable paths that minimizes the cost metric and has the required size for the connection request, Column: 3, paragraph [0019]). Doverspike et al. also disclose that link capacity is expressed as a number of wavelengths in optical networking (Weights are computed for the links using an array representing a restoration link capacity - which is expressed as a number of channels / wavelengths in optical networking, Column: 1, paragraph [0006]). However Doverspike et al. in view of Nishiyama et al. do not disclose using the maximum time delay and the relative time delay as cost metrics to identify the optimal mapping of logical links to the physical topology of a network. In the same field of endeavor, Wolpert clearly shows and discloses using maximum time delay and relative time delay as cost metrics to identify the optimal mapping (This cost, referenced to a particular i-to-j link, may be the maximum or minimum or average bandwidth available, Column: 5, lines 51 –53; the time delay associated with use of that link, or some other suitable measure of cost of using the particular link, column: 5, lines: 51-59; and The preceding development identifies the i-to-j' (u) link for entity transport, using a maximum difference of two J(u)-

component vectors, Target and Actual, that are determined iteratively, Column: 8,lines 43 - 46). Doverspike et al. in view of Wolpert do not completely disclose obtaining a priority order of the network node pairs.

Claims 7 and 9 are rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication No. 200210097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Modiano et al. (Survivable Routing of Logical Topologies in WDM Networks)**.

Consider **claim 7**, and as applied to claim 1, Doverspike et al. as modified by Nishiyama et al. generally silent about using an integer linear program to perform the correlation.

However, in the same field of endeavor, Modiano et al. clearly show and disclose using an integer linear program to find the optimal mapping of logical links to the physical topology of a network (Section III, Integer Linear Programming Formulation: "Using Theorem I, we are able to formulate the problem of survivable routing of a logical topology on a given physical topology as an Integer Linear Program (ILP).").

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an integer linear program as taught by Modiano et al. in the method for identifying optimal mapping of logical links to the physical topology of a

network as in Doverspike et al., Wolpert and Nishiyama et al. for the purpose of solving the optimization problem.

Consider **claim 9**, and as applied to claim 1, Doverspike et al. as modified by Nishiyama et al. do not disclose performing the correlation to identify the optimal mapping for a large Internet network backbone.

However, Modiano et al. clearly show and disclose performing the correlation on the NSFNET (111. Integer Linear Programming formulation, paragraph 8: "To illustrate the utility of this approach, we implemented the ILP for the NSFNET physical topology ...").

It is notoriously well-known in the art that the NSFNET (Figure: 2) is a large Internet network backbone. Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the correlation to identify the optimal mapping on the NSFNET as taught by Modiano et al. using the method for identifying optimal mapping of logical links to the physical topology of a network as in Doverspike et al., Wolpert and Nishiyama et al. for the purpose of solving the optimization problem for a large Internet network backbone.

Claim 8 is rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication No. 2002/0097671 A1)** in view of **Nishiyama et**

al. (European Patent # EP950966) and further in view of **Nucci et al. ("Design of Fault-Tolerant Logical Topologies in Wavelength-Routed Optical IP Networks").**

Consider **claim: 8,** and as applied claim 1, Doverspike et al. as modified by Nishiyama et al. do not disclose that the correlation is performed using a Tabu search methodology.

However, in the same field of endeavor Nucci et al. clearly show and disclose using a Tabu search methodology to find the optimal mapping of logical links to the. physical topology of a network (Section IV, Tabu Search for the SLTDP: The heuristic we propose to use in the solution of SLTDP relies on the application of the Tabu Search (TS) methodology, and Section II, Problem Statement: The Survivable Logical Topology Design Problem (SLTDP) under a given unicast and multicast traffic pattern can be stated to find a logical topology and a mapping that optimize (maximize or minimize) network function).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Tabu search methodology as taught by Nucci et al. in the method for identifying optimal mapping of logical links to the physical topology of a network as in Doverspike et al., Wolpert and Nishiyama et al. for the purpose of solving the optimization problem.

Claim 11 is rejected under 35 U.S.C. 103 as being unpatentable over **Armitage et al. (Design of a Survivable WDM Photonic Network)** in view of **Nishiyama et al. (European Patent # EP950966).**

Consider **claim: 11**, Armitage et al. clearly show and disclose a computer system for identifying optimal mapping of logical links onto the physical topology of a network, with a practical constraint module comprising a mapping option sub-module for obtaining mapping options and a correlation module coupled with the practical constraint module for correlating the mapping options to identify optimal mapping of logical links to the physical topology of the network (Simulation Results: "The DAP Algorithm has been implemented in Mathematica 2.2 for Solaris on a SUN-Sparc computer system 20 workstation. The physical topology used for the tests was the ARPA2 network. The virtual topology has been defined by randomly generating clear-channels to obtain a (at least) bi-connected network with a connectivity of 20%, page 13, section: 3.4; "The Virtual Topology consists of a graph representing all the clear-channels that are present in the network. It is the only view of the network available to the higher layer switches. The Physical Topology is the real network, composed of optical links and photonic nodes. The mapping between these two topologies is performed by the design algorithm, page 2, Definitions, paragraph 4; The effects of correlated failures of many clear-channels sharing each physical link can be eliminated - or at least minimized - by using the Disjoint Alternate Path (DAP) algorithm ...The DAP algorithm maps the clear-

channels onto the physical network in such a way that, for each of them, there exists an alternate path with same end-nodes, but sharing no optical link with the clear-channel to which it is associated, page 7, Design Protection, The Principle, paragraph 2; SPRA means that the shortest route is always used to route a clear-channel on the physical network. In our case, the length of a route is the number of optical links it uses. At each step of the global iteration, a Tabu Search is performed, starting from the initial solution of this step, page 12, paragraphs 4 and 5).

However Armitage et al. is generally silent about disclosing network node priority sub-module for obtaining a priority order of the network nodes; and network node priority order in determining the optimal path.

In the same field of endeavor, Nishiyama et al. clearly show and disclose obtaining a priority order of the network node pairs (Setting priority sequence: the object above can be achieved in the method by providing a sixth step in which when positional relationships between nodes at a reference level or nodes as a reference of placements are determined.... and a seventh step for determining positional relationships such that a pair having the higher priority is located at the nearer position, paragraph [0009]).

Therefore, it would have been obvious to a person of ordinary skill at the time the invention was made to use the module for obtaining a priority level for an entity as

taught by Nishiyama et al. in the computer system for identifying and setting priority sequence for the optimal mapping of logical links in Armitage et al. for the purpose of selecting the optimal logical path which can be a shortest route is always used to route a clear-channel on the physical network. In our case, the length of a route is the number of optical links it uses, which meets a defined time constraint in a network using a Wavelength Division Multiplexing (WDM).

Claims 12 is rejected under 35 U.S.C. 103 as being unpatentable over **Armitage et al. ("Design of a Survivable WDM Photonic Network ")**, and as applied to claim 11 above, and further in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Doverspike et al. (U.S. Patent Application Publication No. 2002/0097671 A1)** in view of

Consider **claim: 12**, and as applied to claim 11, Armitage et al. in view of Nishiyama et al. do not disclose a wavelength sub-module. However, Doverspike et al. clearly show and disclose a wavelength module for obtaining the availability of wavelengths in the network (as shown in Fig. 1, optical mesh network 100 comprises optical cross-connects (OXCs) and optical transport systems (OTSs), Fig. 1 and Column. 2, paragraph [0013]; The optical transport systems in Fig. 1 comprise pairs of bidirectional Wavelength Division Multiplexer (WDM) terminals. The WDM terminals multiplex optical signals at different wavelengths into a single optical fiber for each direction of transmission; Weights are computed for the links using an array representing a

restoration link capacity - which is expressed as a number of channels/wavelengths in optical networking, Column. 1, paragraph [0006]).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the module for obtaining the availability of wavelengths in a network as taught by Doverspike et al. in the computer system of Armitage et al. in view of Nishiyama et al. for the purpose of using wavelength availability as a criteria in identifying the optimal mapping of logical links to the physical topology of the network.

Claims 13 is rejected under 35 U.S.C. 103 as being unpatentable over **Armitage et al. ("Design of a Survivable WDM Photonic Network ")** and as applied to claim 11 above, and further in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Doverspike et al. (U.S. Patent Application Publication No. 2002/0097671 A1)**.

Consider **claim: 13,** and as applied to claim 12, Armitage et al. as modified by Nishiyama et al. and Doverspike et al. clearly show and disclose a computer system wherein the correlation module correlates the mapping options with the network node priority and wavelength availability (Simulation Results: the DAP Algorithm has been implemented in Mathematica 2.2 for Solaris on a Sparc 20 workstation, page 13; "SPRA means that the shortest route is always used to route a clear-channel on the physical network. In our case, the length of a route is the number of optical links it uses.

At each step of the global iteration, a Tabu Search is performed, starting from the initial solution of this step, page 12, paragraphs 4 and 5; Our future work will be oriented towards the introduction of maximal capacity for the optical links and nodes (i.e. having a maximum number of channels per fiber, page 16, Conclusion, paragraph 7).

Claims 14, and 15 are rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication # 2002/0097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966).**

Consider **claim: 14,** Doverspike et al. clearly show and disclose a system for identifying optimal mapping of logical links to the physical topology of the network, the system comprising: means for obtaining one or more mapping options for mapping multiple logical links between one or more pairs of network nodes onto physical paths that are at least relatively disjoint and means for identifying the optimal mapping using a cost metric to assign a weight to the paths (Fig. 1 is a mesh network 100, illustratively an optical network, organized into a general topology of links and nodes, Fig. 1 and Column. 1, paragraph [0012]; with reference to Fig. 1, optical mesh network 100 comprises optical cross-connects (OXCs) and optical transport systems (OTSs), Column. 2, paragraph [0013]; The restoration path is selected from a graph of links in the network which are physically diverse from the service path. For example, in the context of optical networking, the links do not share a common fiber span with the

service path, Column. 1, paragraph [0006]; Selecting a service path in response to the communication request, accordingly, may be accomplished by computing a path between the source and destination that minimizes some cost metric and which has the required size for the connection request. It is assumed that each OXC node has knowledge of the whole optical network topology and the number of free channels on each link as well as some optical link weight function. A known shortest path algorithm such as Dijkstra's shortest path algorithm may be used to compute the minimal weight path through the network, Column. 3, paragraph [0021]; the process of computation of service path and restoration path for a connection request relies on the information about the availability of optical network resources and the path selection objective. A general heuristic is to create some cost metric and select a "minimum weight" path among all suitable paths that minimizes the cost metric and has the required size for the connection request, Column. 3, paragraph [0019]).

However Doverspike et al. is generally silent about disclosing network node priority sub-module for obtaining a priority order of the network nodes; and network node priority order in determining the optimal path.

In the same field of endeavor, Nishiyama et al. clearly show and disclose obtaining a priority order of the network node pairs (Setting priority sequence: the object above can be achieved in the method by providing a sixth step in which when positional relationships between nodes at a reference level or nodes as a reference of placements

are determined.... and a seventh step for determining positional relationships such that a pair having the higher priority is located at the nearer position, paragraph [0009]).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the module for the purpose of selecting the optimal logical path that meets a defined time constraint in a network as taught by Doverspike et al. and obtaining a priority order as taught by Nishiyama et al. for identifying the optimal mapping of logical links to the physical topology of the network.

Consider **claim: 15**, and as applied to claim 14, Doverspike et al. as modified by Nishiyama et al. clearly show and disclose means for obtaining the availability of wavelengths in the network (With reference to Fig. 1, optical mesh network 100 comprises optical cross-connects (OXCs) and optical transport systems (OTSs), Fig. 1 and Column: 3, paragraph [0013]; The optical transport systems in Fig. 1 comprise pairs of bidirectional Wavelength Division Multiplexer (WDM) terminals ... The WDM terminals multiplex optical signals at different wavelengths into a single optical fiber for each direction of transmission, Column: 3, paragraph [0013]; Wavelength: Weights are computed for the links using an array representing a restoration link capacity - which is expressed as a number of channels/wavelengths in optical networking, Column. 1, paragraph [0006]).

Claim 16 is rejected under 35 U.S.C. 103 as being unpatentable over **Doverspike et al. (U.S. Patent Application Publication # 2002/0097671 A1)** in view of **Nishiyama et al. (European Patent # EP950966)** and further in view of **Wolpert (U.S. Patent # 6577601).**

Consider **claim: 16**, and as applied to claim 15, Doverspike et al. as modified by Nishiyama et al clearly show and disclose means for identifying the optimal mapping of logical links using a cost metric to assign a weight to the paths (Fig. 1 is a mesh network 100, illustratively an optical network, organized into a general topology of links and nodes, Fig. 1 and Column. 1, paragraph [0012]; With reference to Fig. 1, optical mesh network 100 comprises optical cross-connects (OXCs) and optical transport systems (OTSs), Column. 2, paragraph [0013]; The process of computation of service path and restoration path for a connection request relies on the information about the availability of optical network resources and the path selection objective. A general heuristic is to create some cost metric and select a "minimum weight" path among all suitable paths that minimizes the cost metric and has the required size for the connection request, and Column. 3, paragraph [0019]) and wavelength availability (Weights are computed for the links using an array representing a restoration link capacity--which is expressed as a number of channels/wavelengths in optical networking, column: 2, paragraph [0006]), except the method which further comprising: correlating the mapping options with

maximum time delay, the relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.

However Doverspike et al. as modified by Nishiyama et al. is generally silent about using maximum time delay and relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.

In the same field of endeavor, Wolpert clearly shows and discloses using maximum time delay and relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network (This cost, referenced to a particular i-to-j link, may be the maximum or minimum or average bandwidth available, Column: 5, lines 51 –53; the time delay associated with use of that link, or some other suitable measure of cost of using the particular link, column: 5, lines: 51-59; and The preceding development identifies the i-to-j' (u) link for entity transport, using a maximum difference of two J(u)-component vectors, Target and Actual, that are determined iteratively, Column: 8,lines 43 – 46) and the priority order (priority level of an entity) of the network node pairs to identify optimal mapping of logical links to the physical topology (for wavelength availability) of a network ((priority level or priority order) The objective of the invention is to optimize some measure of network performance, such as overall entity throughput, average or

minimum or maximum time delay for entity delivery, priority level for an entity, or some other measure of quality of service (QOS) on the network, column. 3, lines 52-59).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use maximum time delay, relative time delay, wavelength availability and network node priority order as cost metrics in the method for identifying optimal mapping of logical links to the physical network topology as in Doverspike et al., Wolpert and Nishiyama et al. for the purpose of selecting the logical path that meets defined time constraints and the optimal logical path.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

- Nusekabel et al. (U.S. Patent # US 6229791 B1) discloses: Method and System for providing partitioning of partially switched network.
- Albanese et al. (U.S. Patent # 7139834 B1) discloses: Data routing monitoring and management.
- Alanyali et al. (U.S. Patent # 6304349 B1) discloses: WDM optical communications network and methods for provisioning.

- Wang (U.S. Patent # 5500808) discloses: Timing information predicting method for mapped and optimized logic network - by generating device for simulating delay time associated with mapped logic network corresponding to logic node in unmapped logic network.

Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450.

Hand-delivered responses should be brought to:

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ketan Soni whose telephone number is (571) 270-1782. The Examiner can normally be reached on Monday-Thursday from 6:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Pérez-Gutiérrez can be reached on 571-272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028. If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Ketan Soni

ks

Apr 02, 2007.

***